K. Sorensen Biol. 1110

Study Guide for Unit 5

1. Know the microbial relationships.
2. Understand the flow of energy and water.
3. Understand the carbon cycle
4. Know the nitrogen cycle inside and out.
5. Know what nitrogen fixation is and the three methods used to fix nitrogen.
6. Know the name of organisms that fix nitrogen.
7. Know the symbiotic relationship the *Rhizobium*, *Anabaena*, and *Frankia* have with their plants.
8. Understand how *Rhizobium* forms nodules on legumes.
9. Be able to recognize a legume from the list that was presented in class.
10. Understand how decomposition takes place and under what conditions it will proceed, faster or slower.
11. Know the nitrogen compounds that are usable to plants.
12. Understand and be able to differentiate Nitrification and denitrification. The order in which each occurs and some organisms that are responsible for each.
13. Know the sulfur cycle and some of the organisms that are involve with sulfate reducing, sulfur reducing, and sulfur oxidizing.
14. Know the how microbes are transmitted in air and the conditions that affect their survival.
15. How do we control these airborne microbes?
16. Know where most microbes live in the soil and the general make-up of the microbe population.
17. Know the factors affecting soil microbes.
18. Know the soil pathogens.
19. Know the factors affecting microbes in an aquatic environment.
20. Understand the oxygen composition in water and soil.
21. Know the organisms in a marine environment.
22. Understand what an oligotrophic environment is.
23. Know the steps for water purification. Understand what each step does.
24. Be able to explain the multiple tube test for water purity.
25. Explain why E. coli is a good indicator organism to use for water quality.
26. Know the pathogens outlined in class that are transmitted in water.
27. Understand the steps of sewage treatment.
28. Know the different kinds of pesticides and what they kill.
29. Understand what bioremediation is and the factors that influence the breakdown of pesticides.
30. Understand the effect of chlorine on the breakdown of molecules.
31. Know the fungus that is used to break down PCBs, heavy metals and TNT.
32. Know the bacteria that break down PCBs.
33. Know the microbes found on grains, fruits, vegetables, meats, and poultry. Be able to describe the conditions or the characteristic spoilage produced by these organisms. Include the effect on humans if it is known.
34. Know the organisms in Milk. Include pathogens and non-pathogens. Know the diseases the pathogens cause.
35. Why is honey dangerous for a small baby.
36. Know the selected pathogens in food and milk and the diseases they cause.
37. Know the three kinds of canned food spoilage and how to recognize them.
38. Define canning.
39. Why is *Bacillus stearothermophilus* important in canning?
40. Understand the preservation process(s) behind jams, jellies, refrigeration, freezing, drying, and lyophilization. Know the effect if any on the microbes.
41. Know the types of radiation and the benefits and draw backs of each.
42. Know the chemical additives to food and how they work.
43. Understand the benefits of using nitrates on meat and why it is dangerous.
44. Know a natural occurring antibiotic in foods and the organism that produces it.
45. Why are antibiotics not use very much to preserve food.
46. Know how milk is pasteurized and sterilized.

47. What advantages do yeast and algae have as food sources.
48. Know the organism used to make bread and sour dough bread.
49. Know the organisms used to make yogurt.
50. Know the process behind cheese production and the organisms used to make cheese.
51. Which organisms are involved in Roquefort and blue, Swiss, Brie, and cheddar?
52. Know the basic differences between prokaryotic and eukaryotic genomes.
53. What is a gene?
54. Know the purines and pyrimadines. Which are involved in DNA and RNA.
55. Understand how the bases pair in DNA.
56. Know the differences between DNA and RNA.
57. Understand replication, transcription, and translation. Where does each process occur in the prokaryotic and eukaryotic cells.
58. What is reverse transcriptase used for and in which organsms?
59. Be able to diagram a replication fork.
60. Define semi-conservative replication.
61. What are the kinds of RNA and describe their function.
62. What is the main difference between eukaryotic and prokaryotic RNA processing.
63. Describe the steps of translation.
64. What is a polyribosome or polysome?
65. Be able to translate a DNA into mRNA and into a polypeptide.
66. Understand which direction DNA travels through a gel, positive pole or negative pole.
67. Understand how the lac operon works in *E. coli*.
68. What types of mutations occur and be able to describe them.
69. How are chromosomes packaged in eukaryotes and prokaryotes.
70. Know the different type of inhibition.
71. Be able to describe transformation, transduction, and conjugation.
72. What is a resistance plasmid, transposon, and a restriction endonuclease.